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# TRANSLATION

AN ADDITIVE FOR SUPPRESSING VANATION  
CORROSION OF FUELS

By

R. A. Lipshteyn, A. S. Avelisyan, et al.

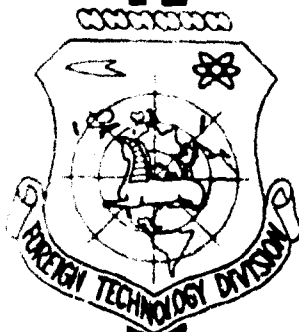
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## UNEDITED ROUGH DRAFT TRANSLATION

AN ADDITIVE FOR SUPPRESSING VANATION CORROSION  
OF FUELS

BY: R. A. Lipshteyn, A. S. Avetisyan, et al.

English pages: 3

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## **AN ADDITIVE FOR SUPPRESSING VANADIAN CORROSION OF FUELS**

**R. A. Lipshteyn, A. S. Avetisyan, et al.**

The use as a fuel for gas-turbine installations of high-sulfur fuel oils which contain a considerable amount of sodium and vanadium prevents the formation of ash deposits on the blades of gas turbines, such deposits causing corrosion at temperatures above 600°C.

One of the measures which enable one to use such fuel oils is the application of additives to the fuel which decrease the formation of ash deposits and vanadian corrosion.

An additive for suppressing the vanadian corrosion of fuels on the basis of green oil is known.

It is proposed for the purpose of improving the properties of the additive to include in the green oil tetraethoxysilane or the bottoms (still residues) in the production of tetraethoxysilane. With the joint use of these additives their effectiveness is higher than with each used separately. The indicated

synergism proves to be a different mechanism of their action.

As components of the additive one uses:

1. Bottoms obtained in the production of tetraethoxysilane which contain 35-37% of  $\text{SiO}_2$  or commercial tetraethoxysilane which contains 40% of  $\text{SiO}_2$  (not very viscous liquids soluble in petroleum products in any proportions).

2. Green oil, the product of the pyrolysis of petroleum produced in accordance with GOST 2985-51.

The concentration of the additive in the fuel and the content in the additive of the indicated components is determined by the ash content of the fuel and the composition of the ash.

Examples of the composition of the additives:

Composition I

Green oil - 65% by weight

Tetraethoxysilane - 35%

Composition II

Green oil - 60%

Bottoms obtained in the production of the tetraethoxysilane - 40%,

The effectiveness of the action of the additives was tested on the first test stand which modeled the conditions of the working of a gas turbine. The tested high-sulfur fuel contained 0.03% by weight of vanadium and 0.002% by weight of sodium (the most corrosive mixture).

As the result of a number of experiments it was established that

the indicated additives (with ratios in the fuel  $S:V=3:1$ ) practically fully suppressed the capacity of the fuel for causing vanadium corrosion of heat-resistant steel (including EI-405 and EYa-1T) with temperatures of the metal up to  $850^{\circ}\text{C}$ .

The additions which include in their makeup for improving their effectiveness should be put into the fuel before hand (not less than 24 hours before it is burned). It is recommended for more even distribution of the additive to introduce it at not less than three points at the top of the fuel in the reservoir.

With a content of vanadium in commercial fuel oil of 0.01% by weight it is necessary to introduce into it from 0.10 to 0.20% by weight of the proposed additives.

#### Object of the invention

An additive for suppressing vanadium corrosion of fuels on the basis of green oil which has the distinguishing feature that for the purpose of improving its properties to the green oil there is added tetraethoxysilane or the bottoms in the production of tetraethoxysilane.